

Amendments to the Drawings:

The attached sheets containing Figures 1 through 7 replace the corresponding drawings as originally filed and new Figures 8 through 10 are added. Changes to the original filed drawings are as follows:

Figure 1 amended to include the legend --Prior Art--.

Figure 2 amended to include the legend --Prior Art--.

Figure 3 amended to include the legend --Prior Art--.

Figure 8 is added to show a circuit having 3 coils orthogonal to one another.

Figure 9 is added to show a coil integrated within a same substrate.

Figure 10 is added to show a coil integrated within a second other substrate.

Attachment: Replacement sheets containing Figures 1 through 7 and new drawing sheets for Figures 8, 9, and 10 following page 12 of this paper.

Remarks/Arguments

Claims 1-20 remain in the application.

Claims 1, 2, 13, and 14 have been amended.

Drawings

Three new drawings are submitted herewith. There is no new matter within the new drawings. Examiner's attention is drawn to the claims that were objected to showing support for the newly entered drawings.

Specification

The Abstract has been amended. The term "is disclosed" has been deleted therefrom. No new matter has been added.

New paragraphs [0014.1]], [0014.2]] and [0014.3]] have been added to provide a brief description of new Figures 8, 9 and 10.

Claim Objections

Claim 1 is amended to more clearly recite inventive features of the present invention.

Claim 13 is amended and the "d" has been added as suggested by the examiner.

Claim Rejections – 35 USC 102

Claims 1, 2, 4-6, 13, 14 and 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Vernon et al (US 6,268,725).

Vernon teaches an electronic compass resulting from providing a pseudo random signal across a coil.

Claims 1-7 as amended recite the limitation of a providing “a differential periodic time-varying current signal.” This is distinctive over the teachings of Vernon. As such, claims 1-7 are no longer anticipated by Vernon.

Claims 9-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Kurihara et al (US 5,757,184).

Applicant traverses the objection as follows:

Kurihara teaches monitoring a voltage potential across a resistor (Fig. 10 number 12). There is no teaching of “monitoring a voltage potential between the pair of contacts” as recited in claim 9 of the present application. In fact, though Kurihara’s circuit includes comparator logic and so forth, it is for comparing a voltage across the resistor 12 with a Vb. This is distinct from the method claimed by the applicant in claim 9 and, as such, cannot anticipate same. Therefore claims 9-12 cannot be anticipated by Kurihara.

Claim Rejections – 35 USC 103

Claims 1, 2, 4-8, 13, 14 and 16-20 are rejected under 35 U.S.C. 103(a) as being obvious over Kurihara et al. in view of Vernon et al.

Both Vernon and Kurihara relate to electronic compasses.

Vernon teaches an electronic compass resulting from providing a pseudo random signal across a coil.

Kurihara teaches an electronic compass with a bilateral electrical switch for inverting magnetic sensor current. Kurihara measures voltage across a resistor in series with the coil (when switches are in a predetermined state).

Kurihara teaches a method of detecting a magnetic effect based on measuring a voltage across a resistor. Applying the teachings of Vernon to Kurihara results in a different drive mechanism for use in Kurihara – a pseudo-random drive mechanism. Such a combination is not similar to the invention as claimed.

In order to make an objection founded on obviousness under U.S. Patent Law, it is established by jurisprudence that there must be some motivation to combine references and some motivation to combine them in a fashion to read on the claimed invention. Here, Vernon teaches a set of advantages in using pseudo-random drive signals. One of skill in the art would not look to the circuit of Vernon absent using the central focus of the teachings. Any application of pseudo-random drive signals is not within the scope of the claims as amended, and as such, does not render the present claims 1-2, 4-8, 13-14, and 16-20 obvious.

Further Kurihara teaches a circuit for measuring magnetic effects based on measuring of a voltage across a resistor (12 in Fig. 10). It would not be obvious to modify Kurihara based on Vernon. Firstly, there is no motivation to such a combination. It cannot be seen what advantage such a combination could have. Secondly, any motivated combination of Kurihara and Vernon does not result in a circuit as claimed in claims 1 and 13.

It is evident from a careful review of Kurihara, that Kurihara senses voltage across a resistor 12 instead of across the coils because the coils are driven with a voltage (Vb). Thus, problems exist in monitoring the voltage Vb and driving of same. Similarly, in Vernon a configuration similar to Applicant's Fig. 2 is employed wherein a resistor is disposed between a voltage driver circuit and the coil to allow direct sensing of the coil voltage independent of the voltage driver circuit. As discussed in the specification, this is problematic. Claim 1 as amended, excludes a resistor for converting driver voltage to current and, as such, is not obvious in light of any of the prior art of record.

Neither Vernon nor Kurihara allow for sensing of time varying voltage across a coil while providing to the coil a time varying current from a current source. This advantageous result of applicant's embodiments is not supported by either Vernon nor Kurihara and cannot be supported by any motivated combination thereof. Therefore, applicant's embodiments have unforeseen advantages and the recited claims cannot be considered obvious.

Therefore, it is respectfully submitted that claims 1-2, 4-8, 13-14, and 16-20 are not obvious over Kurihara in view of Vernon.

No new matter has been added in the amendments. The circuit diagrams shown in the figures, see for example Fig. 4, show a differential drive signal and the specification recites that the drive signal is periodic in nature.

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Applicant looks forward to receiving favourable reconsideration of the instant application.

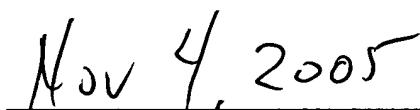
Respectfully submitted,



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